Chapter 3
LIVE TRAINING

Live exercises are conducted in conjunction with, prior to, or after simulation training. An important consideration in choosing to use live training or simulations is what resources are available. Most units have the ability to use organic equipment and locally maintained training devices to train at homestation. The scope of the training can be adjusted to suit the mission needs and the resources available.

Live exercises may be conducted at several levels varying from MILES or TWGSS live-fire simulators to full-scale main gun range exercises using reduced numbers of personnel and equipment. Any combination of weapons simulators, subcaliber devices, and organic weapons may be used to create the desired training effect. The advantages of using live training versus simulators are–

- Unpredictable environmental conditions.
- Increased familiarity with organic weapons systems.
- Full effect of the terrain is incorporated into training event.
- Full replication of all direct fire weapons effects (some limited in most simulators).

The disadvantages of live training are–

- High costs.
- Limited range resources.
- Limited Class V availability.
- Range scheduling constraints.
- Increased OC requirements (limited playback capability when compared with virtual and constructive simulation).
- Environmental restrictions.
- Increased wear and tear on unit equipment.

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The effectiveness of live training can be limited by a unit's ability to match its training objectives to the resources available. Live training can be tailored to address many different training needs from company maneuver to brigade staff operations.

This may be done separately or in a multiecheloned training event in accordance with the unit's METL assessment and training objectives.

Section I. Weapons Simulator Exercises

Weapons simulator exercises employ training devices that do not require live-fire range facilities. The most frequently used training devices use eye-safe lasers integrated into weapons systems fire control such as MILES or TWGSS/PGS. These training devices provide a relatively high degree of realism in training while allowing units a high degree of maneuver freedom not available in LFXs. Weapons simulator exercises allow training across the full combat spectrum of offensive and defensive missions.

MILES and TWGSS/PGS simulate tank and BFV and other main gun or small arms firing effects through a coded laser signal that transmits the type of weapon firing to the target. They may be used against personnel or vehicles, but can also be used with range targetry equipped with LTIDs. MILES is a force-on-force training tool that is readily available at most training areas and most garrisons where combat vehicles are stationed. It is somewhat limited in its ability to replicate gunnery effects back to the firing crew and inhibits the full use of the vehicle due to cable routing and placement of electronic devices that control the MILES transmitters and receivers. TWGSS and PGS are precision gunnery training tools that offer several significant improvements over MILES. TWGSS and PGS simulate the full effects of firing and requires crews to use the same gunnery techniques used during live fire.

MILES and TWGSS/PGS allow the unit freedom in developing the OPFOR scenario and target types. LTIDs can be applied in any scenario and with any target types. This allows the unit to tailor its training to meet its specific mission needs. This may be especially useful during mobilization training when a unit does not have time or resources to conduct live-fire training or travel to a major training area. LTID targetry can be used anywhere that target lifters can be placed. It is important to note that LTIDs must use special reflectors when used with TWGSS/PGS in order to generate a target effect to the gunner. This method provides the flexibility to conduct an FCX on any training land that has enough room for vehicles and targets without the necessity of an impact area.

Full-scale ranges can also be used to support weapons simulator exercises. This would normally be used in circumstances where live ammunition is limited and reduced training costs are desired. Ranges may vary from single purpose specialized ranges to multipurpose range complexes (MPRC). Maneuver unit participation in the FCX may be limited to key leaders based on the intent of the exercise, physical lane size limitations or other such limiting factors. In many situations such exercises can easily facilitate training at all levels; in particular events using MILES can easily be designed to train crew skills as well as collective tasks simultaneously.

The absence of live munitions in these simulator exercises enables units to overcome safety requirements associated with live-fire range operations, which do not exist in a real battlefield. This is regardless of whether the training is conducted on maneuver land or on a traditional live-fire range. There is no requirement for a live OPFOR. This reduces the training overhead in terms of personnel and equipment availability, but it is very dependent upon the availability of LTIDs and weapons simulators. Live simulations offer more maneuver free play, but are more complicated to control and observe. Live weapons simulator exercises are more focused toward the synchronization of fires, maneuver, and C2 in a controlled environment,

A limitation in comparison to other simulations and LFXs is the inability to determine precisely the impact of target effects. Virtual and constructive simulations have the capability to provide detailed feedback to exercise evaluators that show specific information regarding which vehicle killed another and the exact effects of artillery and close air support (CAS). LFXs are harder to monitor specific target effects, but crews can see the immediate effects of their weapons systems as the action occurs. Weapons simulators give a firing signature from the firing vehicle, but there is no way to determine specific target effects. Total target hits or kills are observed with no ability to identify who hit the target.

Weapons simulator exercises at the company level are primarily oriented towards direct fire coordination with limited BOS integration. This is a function of the absence of many BOS elements within the company/team. The use of mortar fires may be simulated using subcaliber devices to train small unit leaders direct and indirect fire coordination. An alternative method may be to conduct a dry fire exercise using weapons simulators in conjunction with a live-fire mortar or artillery range. An example of a multiechelon approach to training might be to incorporate a company level direct fire simulation with a live-fire artillery exercise and a Bn/TF staff coordination exercise.

Weapons simulator exercises at the battalion and brigade level are primarily oriented towards commander and staff synchronization of direct and indirect fires with maneuver and C2. Participation by subordinate maneuver unit key leaders is limited to platoon leaders and company commanders. These subordinate level leaders represent their entire unit and generate information requirements and reports to exercise the staff. The staff and commanders use this information to drive the exercise scenario and develop staff coordination. The overall exercise objective is to coordinate direct and indirect fires, maneuver, and C2 to maximize the effect of fires at the decisive point and time.

The weapons simulator exercises allow the commander to train his unit from company to brigade level in a realistic environment that replicates battlefield conditions for weather, time, and distance. It is cost effective in comparison with LFXs and realistic in comparison with most simulations. Weapons simulator exercises allow the commander to tailor the training by echelon and incorporate multiechelon exercises based on that unit's specific training needs and conduct many iterations without additional cost. The weapons simulator exercises FCX is a flexible, cost effective, and realistic alternative to simulations and live-fire training.

Weapons simulator exercises can be integrated into unit training in several different ways. At the company level, an FCX can be conducted with the direct fire weapon systems using MILES, TWGSS/PGS, and LTIDs. Indirect fire can be integrated using subcaliber mortar devices and/or pyrotechnics. Participation may be limited to the platoon leaders, FIST, and the company commander. Bn/TF and brigade units can conduct their own FCXs on the same terrain/range that the company-level FCX was executed on; however, participation by maneuver units must be limited to key leaders' vehicles in order to have enough training space to support the entire unit.

Section II. Subcaliber Live-Fire Exercises

Subcaliber LFXs are conducted on live-fire ranges using small caliber munitions to replicate tank main gun and BFV 25-mm fires. Subcaliber devices normally associated with the FCX include the 5.56-mm Brewster device (subcaliber training device M180) and the .50 subcaliber Telfare device. The TPGID may also be available in limited numbers in Europe. Subcaliber devices increase the realism for combat vehicle crews, but limit the freedom of maneuver based on range restrictions and safety considerations in a live-fire environment.

Subcaliber LFXs can be conducted on ranges varying in size from mini or scaled ranges to full-scale computerized MPRC facilities. The use of subcaliber training may be due to lack of main gun ammunition or the need to reduce training costs. The primary limitation of subcaliber device training is usually the availability of the subcaliber devices. Availability of training devices may vary significantly from training area to training area and from the active component to the reserve component training facilities.

Scaled ranges usually use the 5.56-mm Brewster device or similar caliber device to replicate main gun fires. This training is conducted on a 1/10th scale range with scaled targets and terrain. A major consideration on this type of range is the use of moving targets. In order to fit the 1/10th scale terrain model, the movement of targets must be slowed as well. The 1/10th scale makes it easy to convert target speed based on models found in FM 17-12-1. Speed conversion is simple based on a factor of 10 so that a target moving at 20 to 30 mph now moves at 2 to 3 mph. One of the main limitations of the scaled subcaliber range is the need to define firing lanes due to safety considerations. Range restrictions may inhibit fire patterns and tactical actions that a unit would normally use. Additionally, this exercise is the most maneuver restrictive of the FCX.

Full-scale ranges can also be used with subcaliber devices to replicate main gun firing. The use of a full-scale range facilitates more realistic conditions for vehicle crews and may provide enough room to incorporate complete units at a reduced cost of

training. Telfare is the most commonly available system to conduct subcaliber training on full-scale ranges. The use of the M2HB .50 caliber machine gun as a tank main gun simulator requires the use of reduced ranges and can be used with full size or scale targets. Target range must be designed around the effective range of the .50 caliber round. The reduced scale targetry size used is normally half of full scale. Additionally, target speed must be reduced by half to accurately replicate the full-scale target.

Subcaliber LFXs at the company level are primarily oriented towards direct fire coordination with limited BOS integration. Just as in the simulation exercises, this is a function of the absence of many BOS elements within the company/team. The use of mortar fires may be simulated using subcaliber devices to train small unit leaders direct and indirect fire coordination. Because subcaliber LFXs are conducted on a live-fire range it should be relatively easy to coordinate subcaliber or full up mortar and artillery live fire as part of the coordination exercise. As in other FCX training events, a multiechelon approach allows the unit to train any element from maneuver companies to battalion and brigade staffs around one exercise.

Subcaliber LFXs at the battalion and brigade level are primarily oriented towards commander and staff synchronization of direct and indirect fires with selective BOS elements. The use of subcaliber devices may allow the unit to conduct a full-scale exercise to train small units in conjunction with these BOS elements. The exercise may also be scaled down to a key leader exercise depending on the training objectives and METL assessments. Although the FCXs focus is fire coordination, leaders can also gain greater proficiency in other collective tasks related to the mission being trained. As leaders coordinate fires with movement, they gain greater proficiency in C2 tasks. Planning for coordination of fires exercises troop-leading and staff planning procedures. Reporting of enemy size, activity, type, and locations prior to initiation of fires exercises the ability to perform tactical intelligence functions and to develop the situation tactically. Once these fundamental tasks have been mastered, a unit can obtain higher levels of performance during STXs and FTX as well as combined arms live-fire exercises. The overall FCX objective is to coordinate direct and indirect fires, maneuver, and C2 to maximize the effect of fires at the decisive point and time.

The subcaliber LFX offers the unit several unique advantages over simulations and full-scale LFXs. Training on a full-scale range offers a high level of realism related to terrain and environment. This exercise also offers more realistic target effects than constructive simulations as well as parts of virtual simulations. SIMNET-T does not have the ability to fire machine guns, small arms, or replicate dismounted infantry maneuver. The subcaliber LFX is designed to incorporate all of these elements. The primary limitation is the limited ability to maneuver due to range restrictions and safety considerations. The subcaliber live-fire method of training provides the commander with a realistic training environment for company to brigade level elements with a reduction in costs compared to full-scale live-fire training.

Section III. Full-Scale Live-Fire Exercises

Full-scale LFXs are conducted using organic weapons systems and selective BOS elements on full-scale range facility of MPRC facility if available. It is normally too expensive to conduct a full brigade or Bn/TF FCX during homestation training events. The range requirements usually restrict all other training conducted in the vicinity of a live-fire FCX. However, the live-fire FCX provides the commander with the most realistic training environment for synchronization of fires, maneuver, and C2 that can be trained without deploying to a major training area.

Full-scale LFXs may be designed with a great deal of flexibility. This training can be conducted from company to brigade. Cost savings are realized by reducing the scope of the exercise to key leaders. The full-scale LFX may incorporate key leaders to platoon leaders or to company commanders depending on the higher commander's training objective. This provides a realistic environment for the commanders and staff while training leader vehicle crews on BOS integration and C2 tasks.

The key leader full-scale LFX emphasizes the effects of actual combat weapons systems while synchronizing BOS elements to maximize the effect. The effects of terrain and weather are integral to the training. This may include engagement area (EA) preparation that includes digging and weapons system sighting. Many weather conditions such as night, fog, and rain cannot be replicated in simulations making the LFX more realistic. This exercise also emphasizes leader training and knowledge of their organic weapons systems in real terms and under actual environmental conditions.

The primary limitations of a full-scale LFX are the amount of range resources required and the limited ability to conduct maneuver in conjunction with the live-fire training. Most full-scale LFXs require enough area to support at least one company. Bn/TF and brigade key leader LFXs require even more range space to replicate the unit. Safety issues and restrictions dictate how much free play may be used to train maneuver.

Company-level LFXs are primarily oriented towards direct fire coordination and may readily incorporate indirect fires. The company/team has limited BOS element integration so the synchronization of fires takes precedence over BOS coordination. Mortar and artillery fire may be fired directly in support of the company exercise if the range layout will allow it. Even with just one company training in the LFX it is possible and desirable to incorporate multiechelon training for the staffs and BOS elements. As in other FCX training events, a multiechelon approach allows the unit to train any element from company maneuver to Bn/TF and brigade staffs around one exercise.

FCXs at the Bn/TF and brigade level are primarily oriented towards commander and staff synchronization of direct and indirect fires with maneuver and C2. The use of organic weapons systems may allow the unit to conduct an exercise to train small unit leaders in conjunction with participating BOS elements, depending on the commander's training objectives and METL assessments.

The full-scale LFX is the most realistic type of FCX. It offers many advantages over simulations and subcaliber exercises in terms of the realism and exposure to terrain and weather, but it is by far the most cost and resource intensive version of the FCX. Simulations and subcaliber training may be used prior to conducting a full-scale LFX to complement the training and to raise the training level sufficiently that time, ammunition, and money is not wasted learning lessons that could be learned in other training environments.

Live fire and weapons simulator exercises offer a wide and varied approach to training commander and staff coordination and synchronization. The effectiveness of this training is only limited by the availability of training devices and ranges and the imagination of the units in developing a training plan to meet their specific needs. Simulators, subcaliber devices, and live ranges may be used separately or together. The key is understanding the training objective and the training need and having the flexibility to incorporate these training methods to meet those needs.